

Report SAM-TR-75-19

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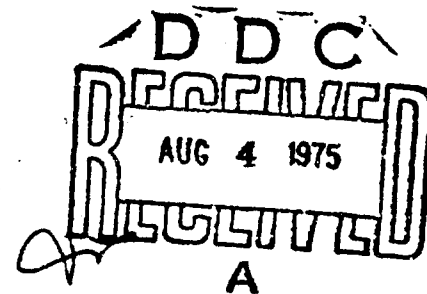
**MAC MID-EAST RESUPPLY OPERATION  
(OCT-NOV 1973) : A RETROSPECTIVE STUDY**

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June 1975

Final Report for Period January 1974 - March 1975



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**USAF SCHOOL OF AEROSPACE MEDICINE  
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER SAM-TR-75-19	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) MAC MID-EAST RESUPPLY OPERATION (Oct-Nov 1973) : A RETROSPECTIVE STUDY.		5. TYPE OF REPORT & PERIOD COVERED Final report. Jan 74 - Mar 75
6. AUTHOR(s) William F. /Storm, Ph.D. Bryce O. /Hartman, Ph.D. Ralph R. /Bollinger, Major, USAF, MC		7. PERFORMING ORG. REPORT NUMBER
8. PERFORMING ORGANIZATION NAME AND ADDRESS USAF School of Aerospace Medicine (VNE) Aerospace Medical Division (AFSC) Brooks Air Force Base, TX 78235		9. CONTRACT OR GRANT NUMBER(s) 17 793009
10. CONTROLLING OFFICE NAME AND ADDRESS USAF School of Aerospace Medicine (VNE) Aerospace Medical Division (AFSC) Brooks Air Force Base, TX 78235		11. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62203F 16 AF-793009-11
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. REPORT DATE 11 Jun 75
14. DISTRIBUTION STATEMENT (of this report)  Approved for public release; distribution unlimited.		15. SECURITY CLASS. (of this report)  UNCLASSIFIED
16. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		17. NUMBER OF PAGES 48
18. SUPPLEMENTARY NOTES		19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  Transport operations Aircrew fatigue
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) During the period 13 October-14 November 1973, the Military Airlift Command (MAC) conducted a unique airlift operation, the Mid-East resupply. Data from crewmen interviews indicate that the resupply was accomplished in a reasonably routine fashion. The workload was heavy but manageable, and the problems reported were not unusual for MAC special operations.		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

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EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

## PREFACE

The authors acknowledge the following USAF School of Aerospace Medicine (SAM) personnel for assistance in the interviewing phase of this study; Sgt Russell A. Benel, Capt Joseph C. Crigler, Mr. Patrick J. Dowd, Sgt Darrell G. Hyde, Sgt Miles A. Smith, Capt Eric C. Stackle, Mr. Clarence F. Theis, and Dr. John E. Vanderveen. We also express our appreciation to the Military Airlift Command crewmen who gave of their own time to permit the interviews.

## MAC MID-EAST RESUPPLY OPERATION (OCT-NOV 1973): A RETROSPECTIVE STUDY

### INTRODUCTION

During the period 13 Oct-14 Nov 1973, crews and aircraft of the Military Airlift Command (MAC) conducted a unique airlift operation, the Mid-East resupply. USAF C141 and C5A aircraft transported over 22,000 tons of supplies to Israel in support of the Mid-East conflict generally referred to as the Yom Kippur War. The distance from the east coast of the United States to Lod Airport in Tel Aviv is about 7,000 miles. The airlift missions were flown in legs, with Lajes AFB in the Azores serving as the major enroute staging point. Thus, some mission legs were in excess of 4,000 miles. Approximately one-half of the payload was transported in 145 missions by C5A aircraft, and the balance in 421 missions, by C141 aircraft. These statistics and many others of a logistical nature have been well documented and justifiably cited as demonstrating the outstanding rapid response and strategic significance of MAC deployment capability.

At the request of MAC, personnel of the Environmental Sciences Division, USAF School of Aerospace Medicine (SAM), interviewed crewmen who had flown these resupply missions. This was an opportunity for SAM to continue its study of MAC operations, crew morale, and crew ratios and aircraft utilization rates (1-7). The Mid-East resupply was unique for this purpose in that it was the first surge effort required of MAC since the drawdown from the Southeast Asia conflict. Of special interest were the impressions and reactions of the individual crewmen who participated in the intense and sudden surge operation.

### METHOD

The interviews took place at the squadrons during spring 1974; 318 crewmen of the 21st Air Force (McGuire and Dover AFBs) and the 22d Air Force (Travis AFB) were questioned. Time and expense did not permit including the MAC squadrons at Charleston, McChord, and Norton AFBs, although these crews were also responsible for the success of this operation. In 5- or 7-member teams 10 SAM scientists and technicians performed the interviews. Each available crewman met with a SAM team member for 45-60 minutes, and each team member questioned representatives of each crew position. Standardization was attained by the consistent use of a formatted questionnaire (Appendix A) which required quantifiable responses that permitted frequency distributions to be generated.

A summary of the crewmen surveyed is presented in Table 1 (aircraft commander, AC; pilot, P; navigator, N; flight engineer, FE; loadmaster, LM). Occasionally 1 or 2 crewmen failed to respond to some of the

questionnaire items and the frequency distributions were necessarily calculated on reduced sample sizes. While most crew positions were adequately sampled, some are better represented than others. Too few 22 AF/C141 pilots and loadmasters were interviewed to permit meaningful analysis and comparison with the rest of the data; also, the 22d Air Force reservists available for interview were all C5A crewmen.

The data are presented in tabular form for most items on the questionnaire. The reader must bear in mind that all statements and tabular presentations are based on responses of only those crewmen available for interviewing. In most cases, there are two main parts to each table. The first portion allows comparison among crew positions between 21st and 22d Air Forces for active duty C141 and C5A crews; the latter portion, comparison between active duty (Act.) and reserve (Res.) personnel, with all crew positions combined because of the small amount of data from reserve crewmen. In general, the most stable and descriptive data for each item are the mean values reported for 21st and 22d Air Force active duty crewmen, with crew positions combined.

#### FINDINGS

Background information was obtained from each crewman interviewed. As would be expected, C141 crews had, on the average, much more prior flying time in their assigned aircraft than did crews assigned to the C5A, which is a relatively new MAC inventory acquisition (Table 2 and Fig. 1). Most of the C5A crewmen, however, had logged substantial flying time in other aircraft prior to C5A assignment. Notable are the large percentages of C141 flight engineers and loadmasters having over 1500 hours experience.

The 21st and the 22d Air Forces had similar distributions of prior surge experience at each crew position within both C141 and C5A crews. Approximately 80% of the aircrew other than pilots had some previous surge and/or related (e.g., combat, exercises) experience; about 50% of the pilots had some prior related experience.

Of those interviewed, about 71% active duty and 88% reserve personnel were immediately available for duty or alert status at the start of the operation. Overall the availability of crewmen was similar for both commands, with some minor differences between crew positions (Table 3). It should be noted that the unavailability of crewmen does not necessarily imply that they were on leave or unable to be contacted by their squadrons. Some crewmen were unavailable because they were currently assigned other responsibilities, such as duty at Wing Headquarters or training at Altus AFB. In most cases nearly 100% were current in all training requirements, with the lowest value being 83% currency among the 22 AF/C141 navigators. Reservists were a little less current (90%) than the active duty crews (97%).

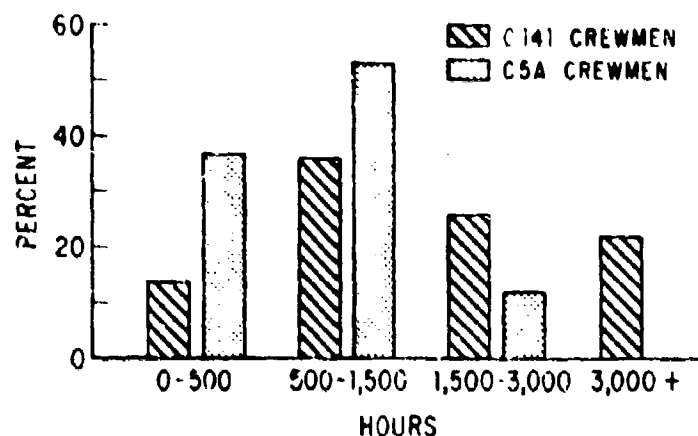


Figure 1. Flying hours accumulated by active duty C141 and C5A crewmen prior to Mid-East resupply operation.

The urgency of the Mid-East resupply operation obviously affected home-base conditions. The most apparent change was an increase in security, not only on the flight lines, but throughout the bases. As depicted in Table 4, most crewmen noted an immediate increase in alert status, or time-on-the-hook; the intensity was not as great for reservists as for active duty personnel, but it was felt. Except for those directly relevant to this operation, squadron duties were set aside. Thus, activity increased in the scheduling office of each squadron, while concern for efforts such as the awards office were temporarily put aside. Flying and ground training (Table 5) were modestly interrupted by the surge, but, based on verbal reports, only for the first 2 weeks. Local flying training was cancelled, which is reflected in the relatively greater disruption of reserve training as compared to active duty inflight training.

Personal family plans and free time were, of course, disrupted; however, personal activities are often left unfinalized by MAC crewmen to avoid disappointment in the event of a sudden mission or, in this case, alert. Leave scheduled prior to the operation was interfered with very little (Table 6). No personnel interviewed were called back from an ongoing leave, and some leaves were granted during the operation.

Of those interviewed, notable crew position differences were found in flying time logged (Table 7) and number of missions flown (Table 8) during the resupply effort. For both C141 and C5A crews, navigators were the most severely taxed, which reflects the current shortage of trained navigators; and C5A navigators averaged about 30 hours more than their C141 counterparts. In addition to having the navigator position as a crew limiting factor, the C141 squadrons had a similar problem with the

loadmaster position. This shortage is also reflected in Table 7, indicating over 50% of the 21 AF/C141 loadmasters logged 100 hours or more during the operation. Of those interviewed, only 25%-33% of the C5A loadmasters were required to fly that much. On the average, C5A aircraft commanders from Travis AFB logged more hours than any of the other ACs; 60% of the 22 AF/C5A commanders logged 100 or more flying hours, and 22% of 22 AF/C141 commanders. The 75th Military Air Squadron (C5A) at Travis AFB reported that 26% of the 145 C5A sorties to Lod Airport were operated by 75th MAS crews. Figures 2 and 3 present graphic summaries of the hours flown in the resupply effort by active duty personnel.

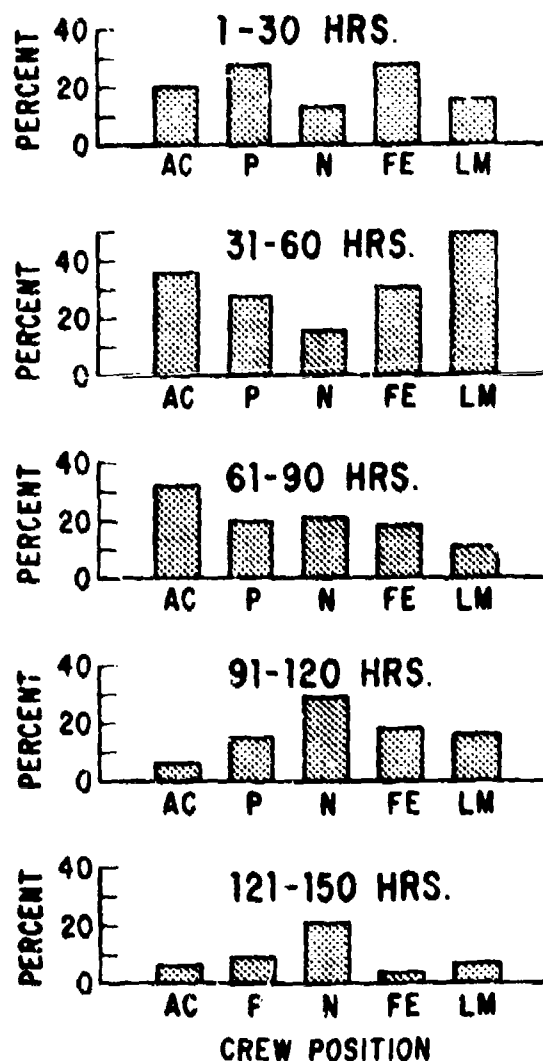


Figure 2. Hours flown by active duty crewmen (by crew position) in support of Mid-East resupply operation.



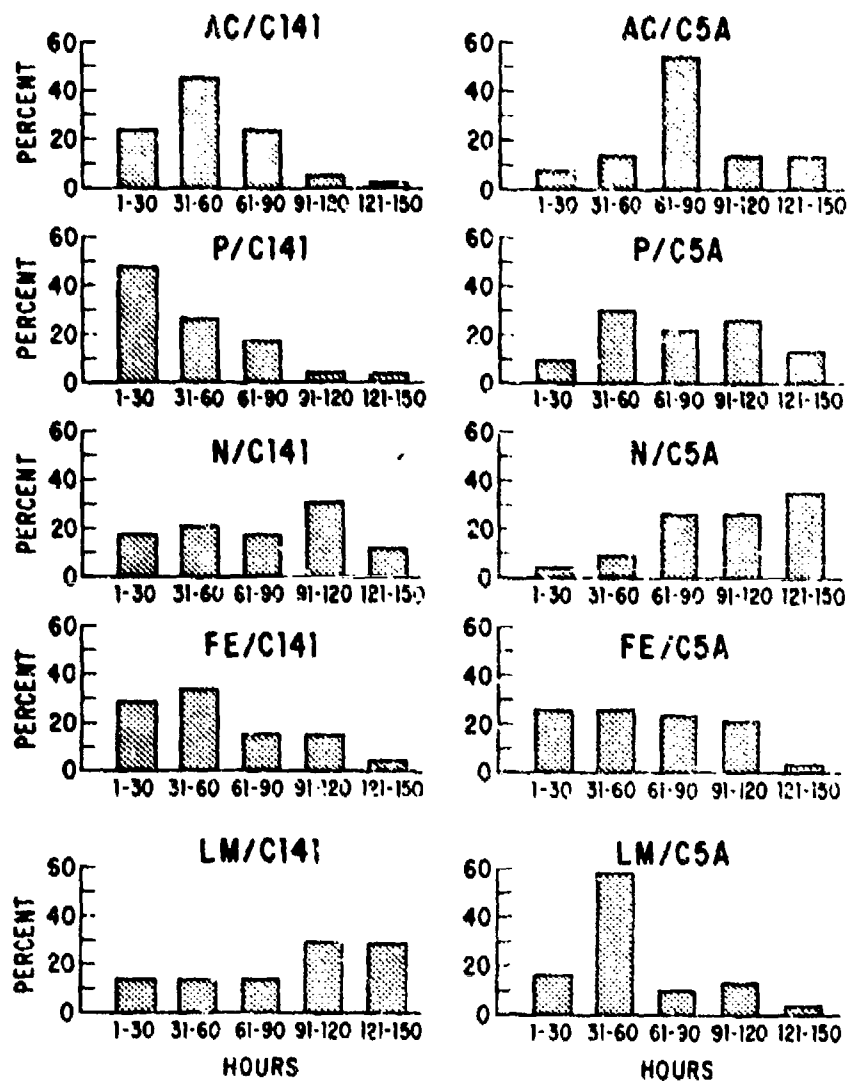


Figure 3. Hours flown by active duty crewmen (crew position by aircraft) in support of Mid-East resupply operation.

Number of missions flown (Table 8) confirms the findings on number of hours logged. Whereas navigators flew an overall average of 2.96 Mid-East resupply missions, all other crew positions flew between 1.77 and 2.41 missions (Fig. 4). Aircraft commanders and pilots of the 22d Air Force averaged more missions than those of the 21st. Averaging across all the squadrons interviewed, more navigators flew 4 or more missions than did any other crewmen (Fig. 5). Overall, there was little difference between 21st and 22d Air Force active duty personnel for hours logged or missions flown; but for the reserves, the overall findings are quite different. A larger percentage of the 22d than of the 21st reservists interviewed flew 4 or more missions and logged more than 100 hours of flying time. A tremendous amount of effort was put out by representatives of all crew positions and all squadrons in the total Mid-East resupply operation. While consumption of navigator time and skills is apparent, the range data in the upper panels of Tables 7 and 8 indicate the efforts of all crewmen involved in this operation.

The average maximum number of days away from home (out in the system) ranged from 1 to 2 weeks (Table 9), although 4 weeks out were reported in some cases. Of those interviewed, crewmen of the 22d Air Force spent more time away from home than those of the 21st (Fig. 6). This finding confirms reports by the 22d Air Force that they returned to the east coast about as rapidly and frequently as 21st crews, but were often unable to proceed to their home squadron before being assigned another eastbound mission (Table 10). The 22d crews were, in essence, staging on the east coast. Interestingly, although in hours and missions flown the navigators were the most severely taxed, they were not so different from the other crewmen in the maximum number of days away from home. The reserve component of each Air Force was out in the system to the same degree as its active duty component. The 2-week average time away from home for the 22 AF/Reserves reinforces the greater number of hours logged and missions flown by this group.

A number of factors are related to and responsible for time spent out in the system and away from home. MAC crews usually are put on 24 hours (12 hours in wartime) predeparture crew rest. Postmission crew rest is usually 1 hour per 3 hours away up to 72 hours. About half the crewmen interviewed had some predeparture and postmission crew rest reduced during the Mid-East resupply effort (Table 11); navigators of the 21st Air Force particularly reported such reduction.

The crew duty day is 16 hours for basic crews and 24 hours for augmented and double crews. On the average, about 25% of the crewmen interviewed exceeded the duty day one or more times (Table 12).

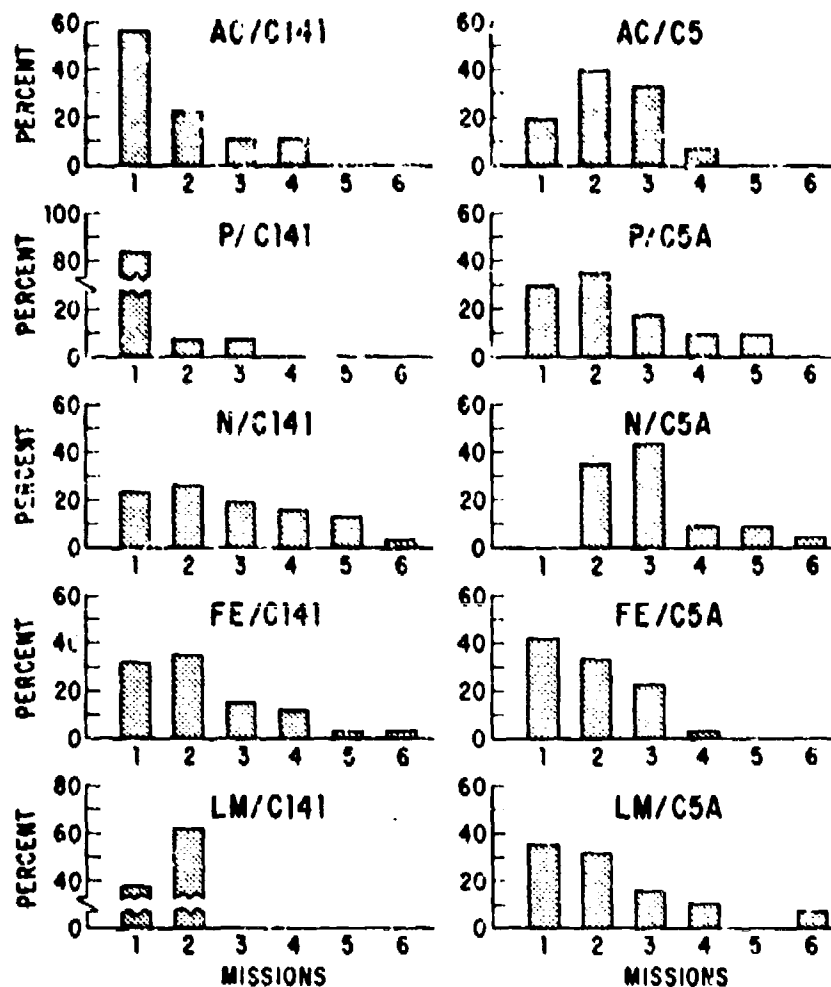


Figure 4. Missions flown by active duty crewmen (crew position by aircraft) in support of the Mid-East resupply operation.

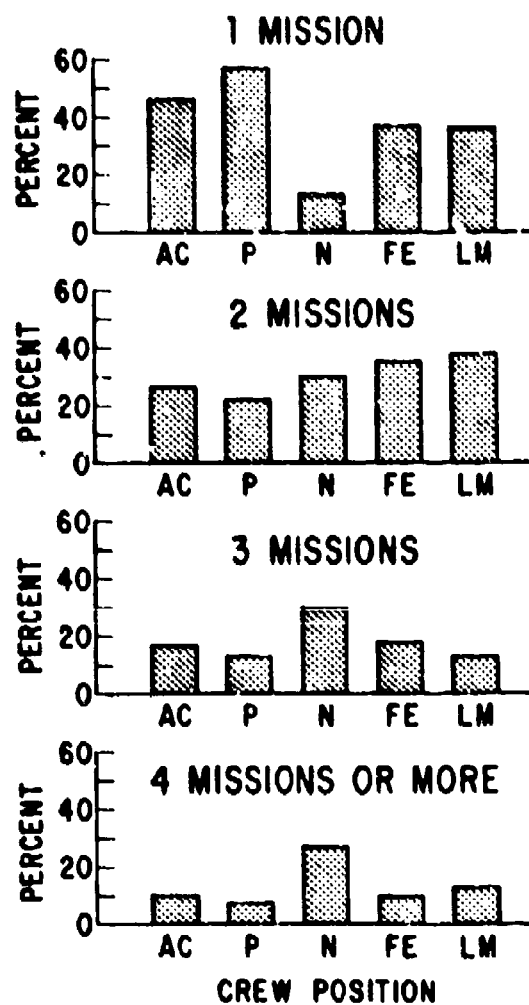


Figure 5. Missions flown by active duty crewmen (by crew position) in support of the Mid-East resupply operation.

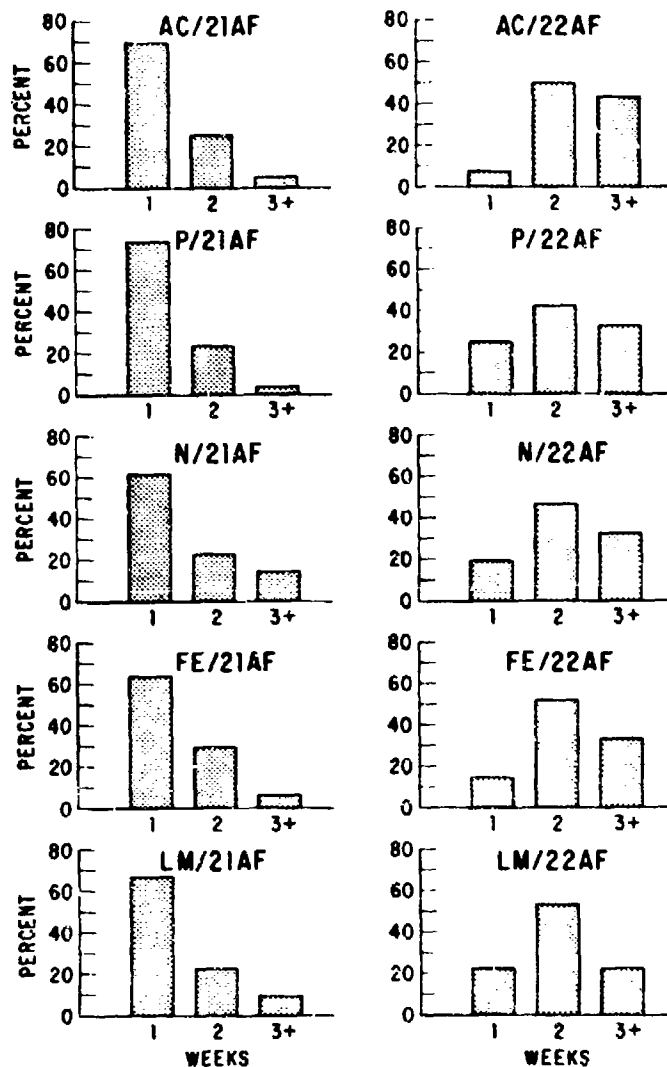


Figure 6. Maximum time (crew position by Air Force) away from home station in support of Mid-East resupply operation.

A critical statistic in MAC operations is the rate of burnout, referring to crewmen exceeding the maximum flying hours permissible per month. Regulations permit 125 hours/month and 330 hours/quarter, but the monthly limit was waived to 150 hours for the Mid-East resupply. Even with the waiver, burnout did occur in subsets of crewmen (Table 13), reflecting the shortage of navigators throughout MAC and loadmasters for C141 aircraft, and the large number of flying hours and missions logged by aircraft commanders of the 22d Air Force.

Two of the most aggravating aspects of MAC operations are ramp-pounding and dead-heading (Table 14). Ramp-pounding pertains to standing around waiting for an aircraft and/or mission, and MAC crews have come to expect it as part of any mission. On the average, 30%-50% of the crewmen of each squadron experienced some ramp-pounding, with the highest incidence reported by both active duty and reserve crewmen of 22 AF/C5A squadrons. Dead-heading occurs when crews fly as passengers. More C141 crewmen experienced dead-heading than did C5A crews, and navigators dead-headed more frequently than other crewmen. Overall, 22d Air Force active duty and reserve crews dead-headed more often than their 21st Air Force counterparts. This finding reflects the transporting of west-coast crews as passengers to the east coast and the Azores to serve as fresh crews and augmentees at staging points. Other aggravations resulted from switching aircraft, cancellations and reschedulings, and general delays (Table 15). A broken aircraft, the unavailability of loading apparatus, an incoming emergency, and ill crewmen are just some of the causes of the above categories.

The modern onboard galley and rest facilities of the C5A receive continued praise from the crewmen. While the C141 crews had only moderate inflight feeding and sleeping problems (Table 16), they occurred considerably more often than they did for C5A crews. The "onboard motel" facility of the C5A has been well received.

The missions flown during the Mid-East resupply operation were not always direct to the Azores and Israel and return. Shuttles were common within continental United States as cargo was maneuvered to the east coast from in-country; and crews often experienced turnarounds following a shuttle mission, either to another shuttle mission or a flight to the Azores (Table 17). A turnaround is usually defined as immediate departure on return from a flight. Diversions also occurred (Table 18); a major cause was to support troops participating in the recurring NATO exercise Reforger. MAC aircraft leaving Israel would fly to Europe to receive troops returning to the United States. Towards the end of the Yom Kippur War, some MAC crews also flew United Nation troops into the Mid-East (Table 18).

An interesting phenomenon of MAC missions is the frequency of night-time launches, and the Mid-East resupply effort was no exception (Table 19). Takeoff times were scheduled to permit a steady flow of supplies to Lod, regardless of clocktime. In normal operations, scheduling is usually

based on allowing unloading during hours of daylight. Due to the range of MAC aircraft and standard mission routes, this backward scheduling factor often results in night takeoffs.

The percentage of crewmen experiencing critical incidents is presented in Table 20. As would be expected, the distribution is equitable across crew positions and aircraft types.

Crewmen had difficulty getting adequate and accurate information during the initial 4-5 days of the operation (Table 21). This was a bit more of a problem for 22d Air Force crews than for those of the 21st Air Force. This difference probably reflects the initially different functions of crews from the two commands. Crews of the 21st Air Force who were out in the system were directed home, either directly or indirectly. Crews of the 22d were diverted and sent, not home, but to the east coast where they were staged and unable to get data from their own squadrons. Information was also initially difficult to obtain at Lajes AFB during the first few days of the operation. However, with the establishment of an Airlift Command Element (ALCE), these problems diminished rapidly. Most crews reported the ALCEs at Lajes and Lod to be efficient, with up-to-date information on intelligence and weather. Crew control at Lajes was separate from the ALCE, but obvious cooperation occurred.

Billering and feeding of crews at Lajes were initially inadequate but improved somewhat with time. The enlisted men particularly had trouble getting appetizing meals. The unavailability of bunks sometimes made locating crews for flight assignment difficult. Crews were sleeping in crowded rooms, outside on the grass, and in a small medical facility. Alerting one crew would often disturb the rest of the others. While most crewmen reported these discomforts, most also accepted them willingly as part of an emergency situation.

Overall, the average maximum ground time for crewmen at Lajes AFB was about 36 hours, with little difference among positions (Table 22). The range data indicate some occasional short periods of time (2-7 hours) and some fairly long periods (several days). The percentages of crewmen at each position who spent a maximum groundtime of 1-72 or more hours at Lajes AFB are presented in Figure 7. While crewmen spent 1-2 days between missions at Lajes, aircraft averaged only about 10 hours groundtime between missions (9.24 hours, C141; 10.45 hours, C5A). The overall aircraft and crewmen data for groundtime are presented in Figure 8.

Maximum groundtime of crews at Lod Airport (Table 22) varied little. Great care was taken to schedule aircraft in and out of Lod as rapidly as possible so as to maintain a minimum of aircraft on the ground while simultaneously maximizing offloading capability. Average groundtime for both crews (Fig. 9) and aircraft (Fig. 10) was 3-4 hours.

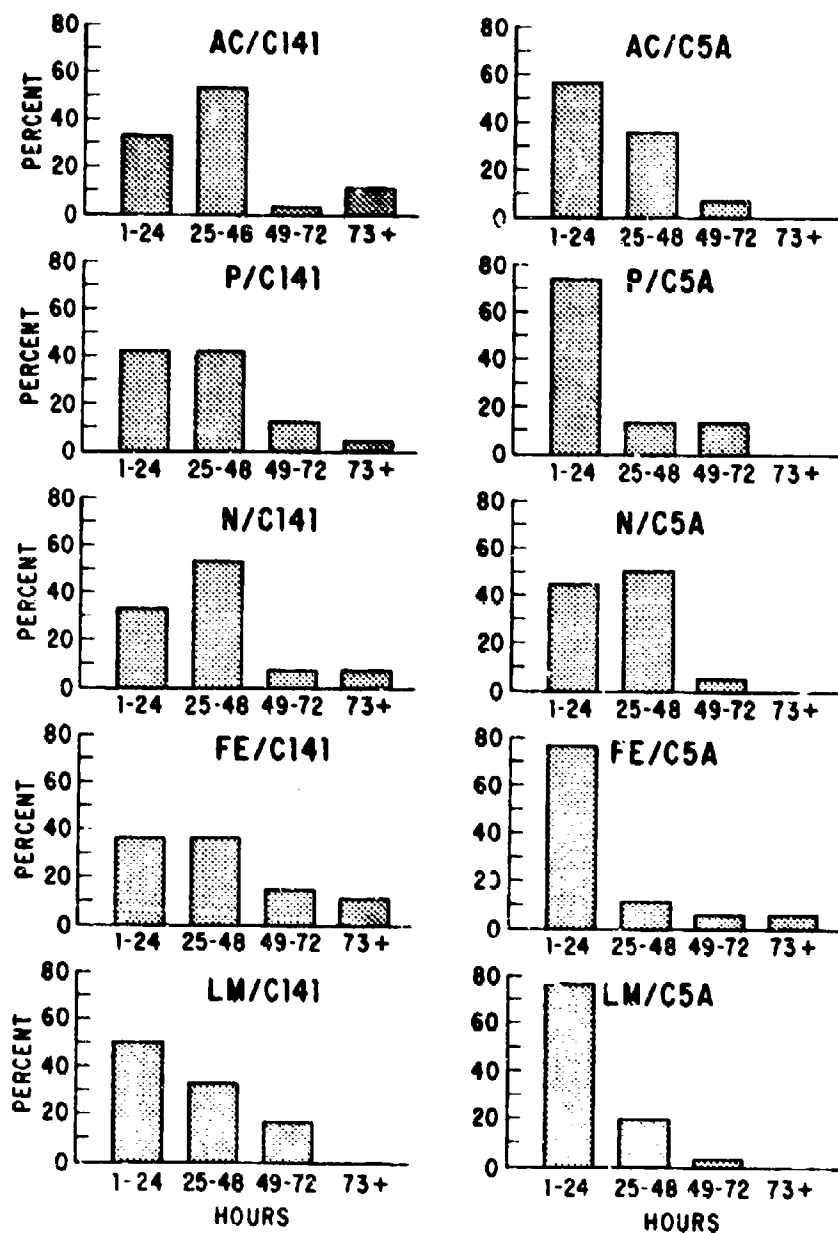


Figure 7. Maximum groundtime hours (new position by aircraft) at Lajes AFB, Azores, in support of Mid-East resupply operation.



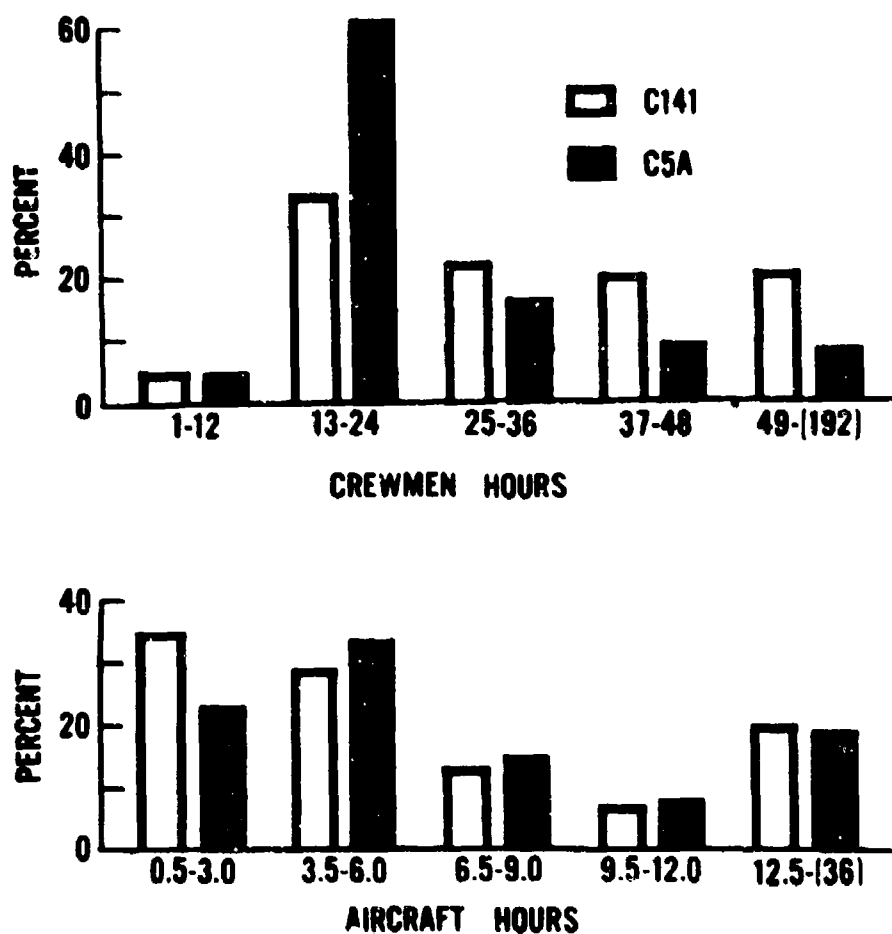


Figure 8. Groundtime for aircrewmembers and aircraft at Lajes AFB, Azores, in support of Mid-East resupply operation.

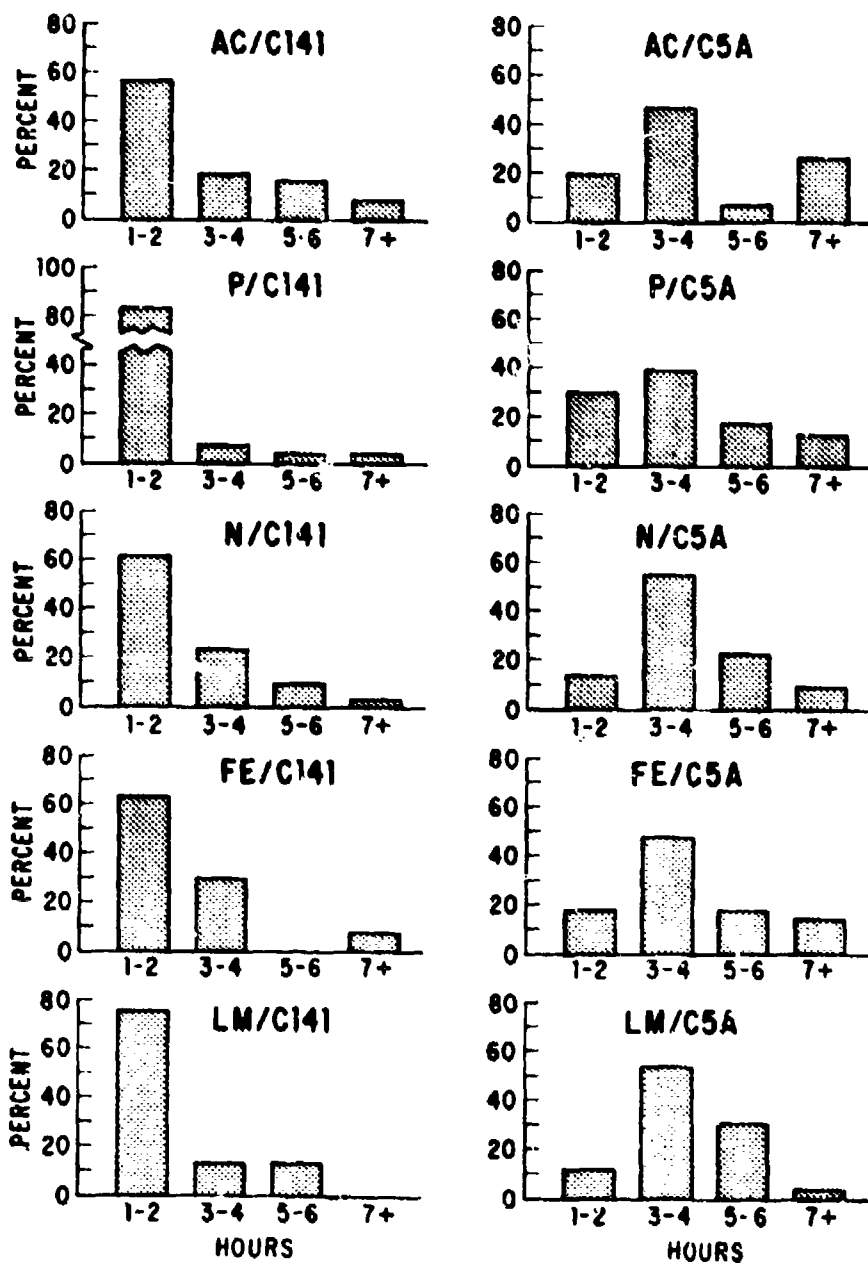


Figure 9. Maximum groundtime (crew position by aircraft) for crewmen at Lod Airport, Tel Aviv, Israel, in support of Mic-East resupply operation.

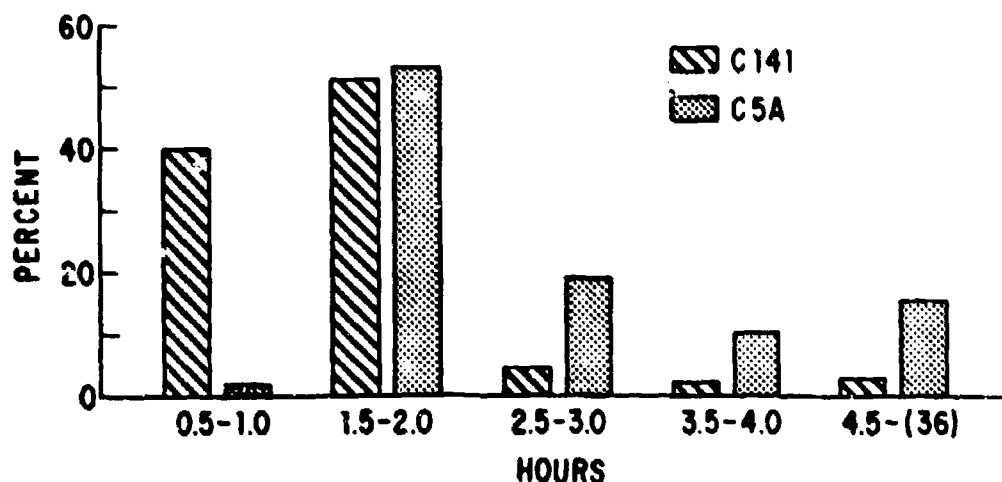


Figure 10. Groundtime for aircraft at Lod Airport, Tel Aviv, Israel, in support of Mid-East resupply operation.

Morale was very high throughout MAC during the Mid-East resupply operation. As noted, crews willingly put up with poor rest facilities. The interactions within crews and between crews, operations, supply, and as one pilot stated, "even maintenance," were outstanding. The standardization of procedures and equipment within MAC contributes to this morale factor. Reserve crewmen flew with active duty personnel, and a waiver permitted "interflying" between 21st and 22d Air Force crewmen. No problems due to this mixing were reported. Negative morale was primarily generated by sitting and waiting for a mission for an extended period of time, as occurred at Lajes occasionally. All crewmen were particularly responsive to the praise received from Israeli personnel at Lod Airport. The obvious appreciation of these allies was perhaps the greatest single morale booster.

Discussion with MAC flight surgeons indicated a few crewmen were assigned "duty not involving flying" (DNIF) as a result of feeling tired and fatigued after missions. However, a review of selected morbidity data from the medical units serving the MAC squadrons interviewed, revealed no apparent differences in DNIF rates between Sept-Nov 1972 and Sept-Nov 1973. There was perhaps some inclination towards an increase in injuries for Oct-Nov 1973. When asked if this operation affected their health, 18% of the C141 crewmen and 8% of the C5A crewmen responded positively (Table 23). In most cases the complaint was of general fatigue and not of some specific ailment. The smaller complaint rate of the C5A crews may indirectly reflect the superior crew facilities of that

aircraft. A few crewmen in each of the squadrons flew resupply missions when they felt they should have been UNIF (Table 23).

The final item on the survey asked the crewmen how long they could have continued the surge if the resupply operation had been extended. Most felt they could have gone on at the surge pace for an additional 2.5-3.0 weeks (Table 24).

#### DISCUSSION

The data indicate that the Mid-East resupply operation was accomplished in a reasonably routine fashion for MAC special operations, with the usual problems and mild stresses normally faced by MAC aircrewmembers. Figure 8 provides one piece of evidence for this statement, showing modal crew groundtime to be 13 to 24 hours and modal aircraft groundtime to be 3 to 6 hours. Both values are characteristic for this kind of operation, and, indeed, for normal MAC operations. Two special problems were reported: (a) lack of crew facilities at Lajes early in the operation, and (b) difficulty on the part of 22d Air Force crewmembers in getting home. The first problem was resolved reasonably well and did not appear to cause extended hardship. The second apparently persisted throughout the operation and added to the stress experienced by 22d Air Force crewmen, but not to an unreasonable degree in view of the total demand levied by the resupply operation.

An item of special interest and relevance is the workload experienced by the crews. This is the underlying factor for all the areas in which we asked questions. Average flying time per 30 days is a commonly used workload management measure. For the Mid-East resupply operation, Table 7 gives averages and ranges of flying time reported. The workload experienced by aircrews during Southeast Asia operations provides a further frame of reference. This period was one of heavy sustained workloads, when the average flying time per month for the line-assigned aircrewman was around 85 hours. The average flying times showing workload for the Mid-East resupply operation (Fig. 11) have been computed as percentages of this representative value of 85 hours. There is considerable variation, with some crewmembers working substantially more than others. As a further comparison, the mean percentages (weighted) for C141 and C5A aircraft are 76.7% and 88.9%, respectively; and for 21st and 22d Air Force, 79.5% and 90.1%. These variations are not as great as those by crew position, reinforcing the observation that workloads varied primarily as a function of crew position (Fig. 11).

Specifically, the workload was exceedingly heavy for C5A navigators in both Air Forces, for C5A aircraft commanders and pilots in the 22d Air Force, and the C141 loadmasters in the 21st Air Force. Systems analysis studies (7) on MAC operations, conducted by the USAF School of Aerospace Medicine, have shown that MAC can achieve flying times around 85 hours per month for limited periods of time. Substantial management manipulation

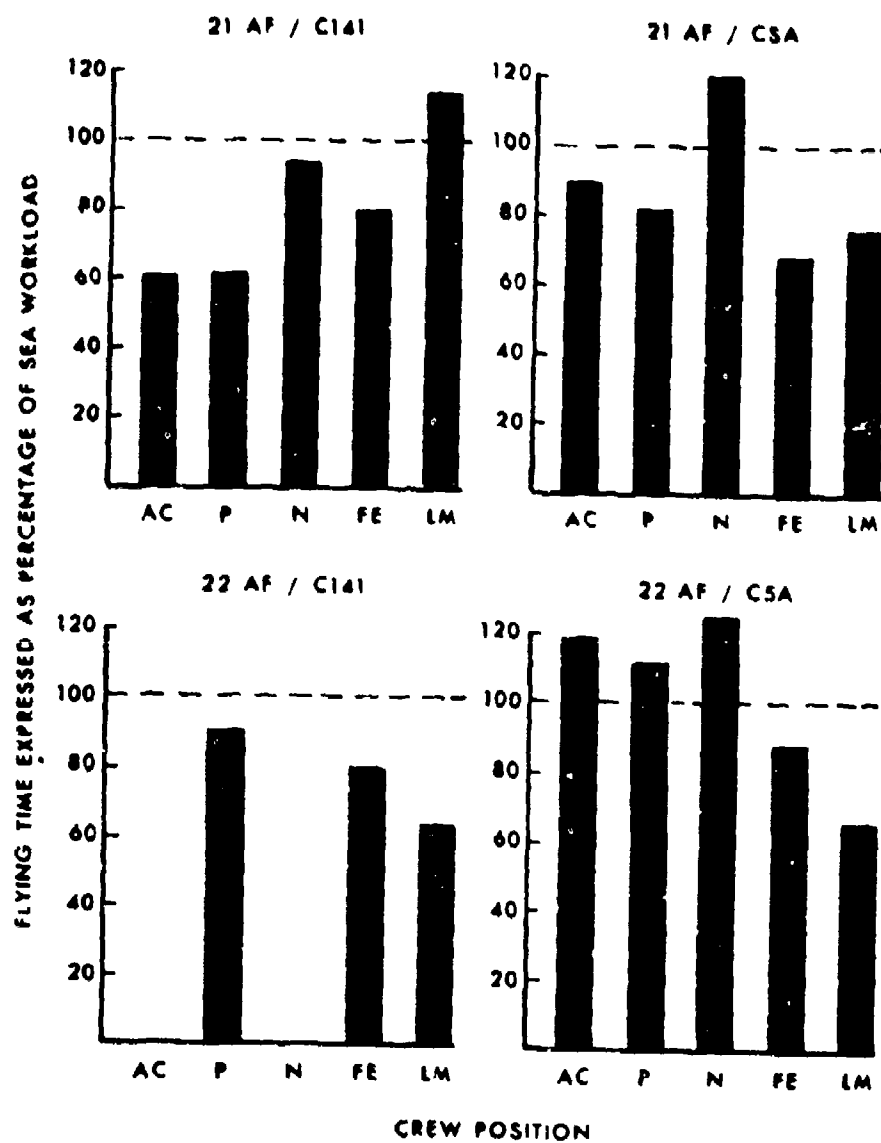


Figure 11. Mid-East resupply operation workload plotted as a percentage of Southeast Asia peak workload (85 hours flying time per month).

is needed to achieve average flying time in excess of 85 hours. Undoubtedly, such manipulations resulted in problems reported by some crewmembers, such as burnout and dead-heading. In general, however, the workload was heavy but manageable, and the problems reported were not unusual for special MAC operations. It is to the credit of the Military Airlift Command that they were able to accomplish this unique and demanding operation with so little in the way of crew perturbations.

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TABLE 1. SAMPLE SIZES: MAC CREWMEN INTERVIEWED FOLLOWING PARTICIPATION IN MID-EAST RESUPPLY OPERATION

Crew position	21st AF		22d AF		Total/Alr Force			Total/Aircraft			Total crewmn
	CL41	C5A	CL41	C5A	Total	Total	Total	Total	C5A		
					21AF	22AF	CL41				
Active duty											
AC	28	10	9	5	38	14	37	15	52		
P	24	12	1	11	36	12	25	23	48		
N	27	14	6	9	41	15	33	23	56		
FE	27	23	14	13	50	27	41	36	77		
LM	8	23	4	9	21	13	12	32	44		
Combined	114	82	34	47	196	81	148	129	277		
Reserve											
AC	9	1	0	2	10	2	9	3	12		
P	0	0	0	3	0	4	0	3	3		
N	3	1	0	4	4	3	3	5	8		
FE	5	5	0	2	10	2	5	7	12		
LM	3	1	0	2	4	2	3	3	6		
Combined	20	8	0	13	28	13	20	21	41		
Total crews											
AC	37	11	9	7	48	16	46	18	64		
P	24	12	1	14	36	15	25	26	51		
N	30	15	6	13	45	19	36	28	64		
FE	32	22	14	15	60	29	46	43	89		
LM	11	24	4	11	35	15	15	35	50		
Combined	134	90	34	60	224	94	168	150	318		

TABLE 2. FLYING TIME IN C141 AND C5A PRIOR TO  
MID-EAST RESUPPLY OPERATION

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
<u>Less than 500 hrs</u>				
AC	11	40	0	40
P	64	83		91
N	23	50	25	25
FE	0	30	0	0
LM	0	17		0
<u>500-1,500 hrs</u>				
AC	68	30	88	60
P	36	17		9
N	39	14	50	75
FE	10	57	8	91
LM	0	83		100
<u>1,500-3,000 hrs</u>				
AC	16	30	12	0
P	0	0		0
N	15	36	0	0
FE	60	13	8	9
LM	83	0		0
<u>3,000 hrs or more</u>				
AC	5	0	0	0
P	0	0		0
N	23	0	25	0
FE	30	0	84	0
LM	17	0		0

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Less than 500 hrs	29	37	21	85
500-1,500 hrs	42	26	54	15
1,500-3,000 hrs	22	26	9	0
3,000 hrs or more	7	11	16	0



TABLE 3. CREWMEN (X) AVAILABLE AT START OF ALERT

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	69	70	67	100
P	79	83		100
N	64	50	83	56
FE	63	65	79	92
LM	43	70		88

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
67	86	80	92

TABLE 4. CREWMEN (X) EXPERIENCING INCREASED ALERT STATUS (TIME-ON-THE-HOOK)

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	89	80	67	80
P	75	75		64
N	82	100	50	44
FE	85	65	86	42
LM	75	78		78

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
81	50	68	46

TABLE 5. CREWMEN (%) EXPERIENCING REDUCED FLYING AND GROUND TRAINING

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
<u>Flying training</u>				
AC	3	0	44	20
P	29	25		9
N	19	0	17	11
FE	19	9	21	8
LM	0	0		0
<u>Ground training</u>				
AC	7	0	22	0
P	4	0		9
N	19	21	17	11
FE	19	22	14	15
LM	0	4		22

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Flying trng	12	39	15	31
Ground trng	11	14	16	15

TABLE 6. CREWMEN (%) EXPERIENCING DISRUPTION OF LEAVE PLANS

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	4	0	33	0
P	11	13		0
N	0	0	0	14
FE	5	0	0	11
LM	25	0		0

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
4	0	8	0

TABLE 7. HOURS FLOWN DURING MID-EAST RESUPPLY OPERATION

A. Active Duty Personnel

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
	<u>Mean and range</u>			
AC	52 (10-110)	76 (20-140)	77 (30-150)	100 (70-150)
P	53 (20-150)	69 (30-140)		94 (40-150)
N	80 (10-140)	102 (50-150)	68 (10-100)	105 (10-150)
FE	67 (20-140)	57 (20-110)	54 (10-110)	75 (30-150)
LM	97 (30-150)	64 (10-150)		55 (55-120)

% Flying 40 hrs or less

AC	52	10	11	0
P	61	33		18
N	22	0	33	11
FE	40	41	31	8
LM	14	26		50

% Flying 100 hrs or more

AC	3	10	22	60
P	9	25		55
N	48	57	17	67
FE	24	23	15	25
LM	57	15		13

B. Active Duty vs. Reserve Personnel

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Mean and range	67 (10-150)	50 (20-150)	75 (10-150)	84 (30-130)
% Flying 40 hrs or less	34	63	23	23
% Flying 100 hrs or more	33	4	11	54

TABLE 8. MISSIONS FLOWN DURING MID-EAST RESUPPLY OPERATION

A. Active Duty Personnel

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
	<u>Mean and range</u>			
AC	1.54 (1-4)	2.10 (1-4)	2.44 (1-4)	2.60 (2-3)
P	1.25 (1-3)	2.00 (1-5)		2.64 (1-5)
N	3.04 (1-9)	2.93 (2-5)	2.20 (1-4)	3.20 (2-6)
FE	2.42 (1-6)	1.65 (1-3)	1.93 (1-3)	2.23 (1-4)
LM	1.63 (1-2)	2.53 (1-6)		1.50 (1-3)

% Flying 1-3 missions

AC	93	90	78	100
P	100	83		82
N	65	79	80	78
FE	81	100	86	92
LM	100	78		100

% Flying 4 or more missions

AC	7	10	22	0
P	0	17		18
N	33	21	20	22
FE	19	0	14	8
LM	0	22		0

B. Active Duty vs. Reserve Personnel

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Mean and range	2.11 (1-9)	2.00 (1-6)	2.29 (1-6)	2.77 (1-5)
% Flying 1-3 missions	86	93	87	62
% Flying 4 or more missions	14	7	13	38

TABLE 9. MAXIMUM DAYS AWAY FROM HOME

A. Active Duty Personnel

Crew position	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
	<u>Mean and range</u>			
AC	7.3 (2-21)	6.7 (3-12)	15.3 (7-25)	13.8 (9-22)
P	7.3 (3-15)	5.1 (4-7)		13.3 (5-23)
N	10.5 (4-36)	6.6 (3-12)	14.0 (6-22)	11.2 (2-22)
FE	9.8 (2-32)	5.6 (1-12)	14.1 (7-24)	12.1 (4-22)
LM	9.9 (3-21)	6.5 (3-16)		12.4 (6-28)

% Away 1 week or less

AC	71	60	11	0
P	63	100		18
N	58	69	33	11
FE	44	86	14	15
LM	38	77		22

% Away 3 weeks or more

AC	7	0	44	40
P	4	0		36
N	23	0	50	22
FE	12	0	42	23
LM	25	5		22

B. Active Duty vs. Reserve Personnel

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Mean and range	7.7 (1-36)	7.1 (3-17)	13.1 (2-28)	15.4 (7-24)
% Away 1 week or less	67	73	17	8.3
% Away 3 weeks or more	8	8	20	33

TABLE 10. CREWMEN (%) EXPERIENCING DIFFICULTY GETTING HOME

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	28	0	44	50
P	33	0		27
N	37	14	50	33
FE	15	13	50	23
LM	38	13		0

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
21	29	34	39

TABLE 11. CREWMEN (%) EXPERIENCING REDUCED PREDEPARTURE  
AND POSTMISSION CREWREST

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
<u>Predeparture</u>				
AC	35	40	56	40
P	29	50		46
N	70	86	33	11
FE	52	35	50	31
LM	50	57		22
<u>Postmission</u>				
AC	48	60	56	40
P	42	75		73
N	78	86	33	50
FE	59	61	43	23
LM	75	52		56

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Predeparture	49	36	37	15
Postmission	61	38	46	33

TABLE 12. CREWMEN (%) WHO EXCEEDED CREW DUTY DAY

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	24	50	22	25
P	25	36		50
N	30	29	33	11
FE	26	26	15	33
LM	13	30		11

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
28	21	24	39

TABLE 13. CREWMEN (%) WHO EXPERIENCED BURNOUT

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	7	0	33	25
P	4	8		0
N	22	14	17	33
FE	7	4	15	8
LM	25	4		11

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
9	7	15	8



TABLE 14. CREWMEN (%) EXPERIENCING RAMP-POUNDING AND DEAD-HEADING

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
<u>Ramp-pounding</u>				
AC	38	30	56	80
P	25	42		70
N	48	29	17	50
FE	26	52	43	46
LM	63	35		56
<u>Dead-heading</u>				
AC	21	30	56	20
P	25	8		27
N	48	21	83	44
FE	44	13	71	15
LM	38	35		78

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Ramp-pounding	38	32	50	69
Dead-heading	29	32	49	62

TABLE 15. CREWMEN (%) SWITCHING AIRCRAFT AND EXPERIENCING  
CANCELLATIONS AND RESCHEDULINGS AND GENERAL DELAYS

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
<u>Switching aircraft</u>				
AC	38	50	78	100
P	42	33		64
N	41	71	33	89
FE	37	44	92	69
LM	63	44		88
<u>Cancellations and reschedulings</u>				
AC	36	40	22	40
P	42	42		46
N	59	21	33	22
FE	48	22	50	39
LM	13	22		44
<u>General delays</u>				
AC	31	50	56	60
P	25	42		91
N	37	50	67	56
FE	44	39	79	54
LM	38	30		33

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Switching air- craft	44	61	76	69
Cancellations and reschedulings	37	11	38	39
General delays	37	14	62	39

TABLE 16. CREWMEN (%) EXPERIENCING INFLIGHT FEEDING  
AND SLEEPING PROBLEMS

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
	<u>Feeding</u>			
AC	31	10	11	20
P	13	0		0
N	19	0	0	0
FE	22	9	14	8
LM	13	4		0
	<u>Sleeping</u>			
AC	31	10	67	40
P	33	33		9
N	37	14	50	0
FE	22	13	43	0
LM	50	4		11

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Feeding	14	14	6	8
Sleeping	24	11	25	8

TABLE 17. CREWMEN (%) EXPERIENCING SHUTTLES AND TURNAROUNDS

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
	<u>Shuttles</u>			
AC	28	40	44	20
P	42	17		82
N	37	21	17	22
FE	22	13	36	69
LM	50	26		22
	<u>Turnarounds</u>			
AC	21	10	33	20
P	29	8		18
N	26	7	0	22
FE	33	30	29	23
LM	13	13		22

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Shuttles	28	7	41	46
Turnarounds	22	14	22	33

TABLE 18. CREWMEN (%) EXPERIENCING DIVERSIONS AND PARTICIPATING  
IN DEPLOYMENT OF UNITED NATION TROOPS

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
	<u>Diversions</u>			
AC	28	20	33	20
P	50	17		18
N	37	7	50	33
FE	44	9	43	0
LM	75	13		22
	<u>Deployment of U.N. troops</u>			
AC	7	10	22	0
P	4	0		0
N	22	14	17	0
FE	35	4	29	0
LM	0	13		0

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Diversions	29	15	26	8
Deployment of U.N. troops	13	11	9	0

TABLE 19. CREWMEN (%) EXPERIENCING NIGHTTIME LAUNCHES

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	83	90	88	100
P	88	100		91
N	93	93	83	89
FE	74	87	93	100
LM	75	96		78

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
87	75	91	100

TABLE 20. CREWMEN (%) EXPERIENCING CRITICAL INCIDENTS

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	21	30	44	20
P	8	33		27
N	19	39	50	11
FE	39	26	29	8
LM	0	30		22

B. Active Duty vs. Reserve Personnel (% combined crew positions)

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
25	19	25	33

TABLE 21. CREWMEN (%) RECEIVING INADEQUATE AND INACCURATE INFORMATION

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
<u>Inadequate information</u>				
AC	52	20	56	40
P	30	25		27
N	44	36	67	56
FE	48	26	57	31
LM	13	26		67
<u>Inaccurate information</u>				
AC	38	30	0	0
P	38	17		36
N	26	29	33	22
FE	33	30	50	23
LM	25	13		44

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Inadequate information	37	21	51	39
Inaccurate information	29	14	30	31

TABLE 22. AVERAGE MAXIMUM GROUNDTIME (HOURS) AT  
LAJES AFB AND LOD AIRPORT

A. Active Duty Personnel

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
<u>Lajes AFB</u>				
AC	36.5 <sup>a</sup> (12-144) <sup>b</sup>	30.9 (18-72)	72.3 (12-192)	26.0 (2-36)
P	40.0 (15-168)	25.5 (7-72)		31.1 (16-72)
N	39.4 (3-96)	31.0 (15-72)	24.8 (16-48)	32.5 (18-48)
FE	48.1 (10-144)	31.8 (2-120)	34.9 (3-72)	22.7 (12-72)
LM	30.5 (15-72)	22.9 (14-72)		21.9 (15-36)
<u>Lod Airport</u>				
AC	6.0 (1-72)	5.0 (2-20)	2.6 (1-7)	4.0 (3-7)
P	3.0 (1-24)	3.6 (2-7)		4.3 (2-8)
N	2.7 (1-7)	4.6 (2-14)	3.2 (2-6)	3.8 (2-7)
FE	2.4 (1-7)	5.2 (2-12)	3.5 (2-9)	3.7 (2-6)
LM	2.5 (1-5)	4.8 (2-18)		3.2 (3-4)

B. Active Duty vs. Reserve Personnel

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Lajes AFB	35.7 (2-168)	35.6 (15-96)	36.0 (2-192)	27.1 (14-49)
Lod Airport	4.1 (1-72)	5.3 (1-72)	3.5 (1-9)	5.0 (2-7)

<sup>a</sup>mean

<sup>b</sup>range



TABLE 23. CREWMEN (%) REPORTING HEALTH AFFECTED BY MID-EAST RESUPPLY OPERATION AND WHO ORDINARILY WOULD HAVE BEEN ON DUTY NOT INVOLVING FLYING

A. Active Duty Personnel (% each crew position)

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
	<u>Health affected</u>			
AC	14	0	33	0
P	8	0		27
N	33	14	17	11
FE	15	9	14	8
LM	13	9		0
	<u>Ordinarily on DNIF</u>			
AC	7	0	0	20
P	8	0		9
N	11	14	0	0
FE	11	4	7	0
LM	0	17		0

B. Active Duty vs. Reserve Personnel (% combined crew positions)

	<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
Health affected	13	0	14	8
Ordinarily on DNIF	9	0	4	8

TABLE 24. AVERAGE RESPONSE OF CREWMEN TO THE QUESTION: "HOW LONG (WEEKS) COULD YOU HAVE CONTINUED THE SURGE?"

A. Active Duty Personnel

<u>Crew position</u>	<u>21AF/C141</u>	<u>21AF/C5A</u>	<u>22AF/C141</u>	<u>22AF/C5A</u>
AC	2.6	3.6	3.0	2.3
P	2.8	2.8		2.2
N	2.7	2.6	2.2	2.9
FE	3.2	2.9	2.6	2.2
LM	3.3	3.0		2.9

B. Active Duty vs. Reserve Personnel

<u>21AF/Act.</u>	<u>21AF/Res.</u>	<u>22AF/Act.</u>	<u>22AF/Res.</u>
2.9	3.2	2.6	2.5

APPENDIX A  
QUESTIONNAIRE

## RETROSPECTIVE STUDY OF MIDEAST RESUPPLY

Date: \_\_\_\_\_

Squadron: \_\_\_\_\_

BACKGROUND INFORMATION  
(NB: See identifier)

Name: \_\_\_\_\_

SSAN: \_\_\_\_\_

Rank: \_\_\_\_\_ Age: \_\_\_\_\_

Marital Status: \_\_\_\_\_

Number of Dependents: \_\_\_\_\_

Aircrew Position: \_\_\_\_\_

Total Flying Time at Beginning of Nickel Grass: \_\_\_\_\_

Flying Time in Nickel Grass Aircraft: \_\_\_\_\_

Flying Time During Nickel Grass: \_\_\_\_\_

Number of Missions Flown During Nickel Grass: \_\_\_\_\_

Previous Surge Experience: \_\_\_\_\_

Related Experience (e.g., combat, exercises): \_\_\_\_\_

Status at Start of Surge: \_\_\_\_\_

a. Availability: \_\_\_\_\_

b. Currency: \_\_\_\_\_

c. Hours till Burnout: \_\_\_\_\_

Recall (Alert notification &amp; reporting times): \_\_\_\_\_

Identifier

HOME BASE CONDITIONS DURING NICKEL GRASS

Did you experience changes in:

- |    | Yes   | No    |                                    |
|----|-------|-------|------------------------------------|
| 1. | _____ | _____ | Time-on-hook (Bravo & Alpha Alert) |
| 2. | _____ | _____ | Squadron duties                    |
| 3. | _____ | _____ | Flying training                    |
| 4. | _____ | _____ | Ground training                    |
| 5. | _____ | _____ | Pre-departure crew rest            |
| 6. | _____ | _____ | Post-mission crew rest             |
| 7. | _____ | _____ | Free time                          |
| 8. | _____ | _____ | Scheduled leave                    |
| 9. | _____ | _____ | Personal plans                     |

Identifier

**NICKEL GRASS MISSION CONDITIONS**  
(NB: Except Staging and End Points)

Specify: Your maximum number of days away from home was \_\_\_\_\_  
Did you Experience:

- | Yes       | No    |  |
|-----------|-------|--|
| 1. _____  | _____ | Delays (why?)                            |
| 2. _____  | _____ | Cancellations and reschedulings          |
| 3. _____  | _____ | Ramp-pounding                            |
| 4. _____  | _____ | Misinformation                           |
| 5. _____  | _____ | Inadequate information                   |
| 6. _____  | _____ | Dead-heading                             |
| 7. _____  | _____ | Problems with in-flight feeding          |
| 8. _____  | _____ | Problems with in-flight sleeping         |
| 9. _____  | _____ | Diversions (e.g., to Reforger)           |
| 10. _____ | _____ | Participation in Night Reach             |
| 11. _____ | _____ | Turn-arounds                             |
| 12. _____ | _____ | Shuttles                                 |
| 13. _____ | _____ | Switching aircraft                       |
| 14. _____ | _____ | Difficulty getting home                  |
| 15. _____ | _____ | Nighttime launches                       |
| 16. _____ | _____ | Critical incidents (which?)              |
| 17. _____ | _____ | Exceeding crew duty day                  |
| 18. _____ | _____ | Burning out                              |
| 19. _____ | _____ | Flying when you ordinarily would be DNIF |

Identifier \_\_\_\_\_

CONDITIONS AT LAJES AND LOD DURING NICKEL GRASS

Specify: Your maximum ground time at Lod was \_\_\_\_\_; at Lajes was \_\_\_\_\_  
Did you Experience:

- |    | Yes   | No    |                                   |
|----|-------|-------|-----------------------------------|
| 1. | _____ | _____ | Inefficiency                      |
| 2. | _____ | _____ | Delays (where & why?)             |
| 3. | _____ | _____ | Servicing problems                |
| 4. | _____ | _____ | Eating problems                   |
| 5. | _____ | _____ | Sleeping problems                 |
| 6. | _____ | _____ | Boredom                           |
| 7. | _____ | _____ | Ramp pounding                     |
| 8. | _____ | _____ | Difficulties with the ALCE or ACP |

Identifier

CREW INTERACTIONS DURING NICKEL GRASS

Describe as unusually good (g), normal (n) or difficult (d) your relationship

	g	n	d	
1.	—	—	—	Own crew
2.	—	—	—	Other crews
3.	—	—	—	Commanders
4.	—	—	—	ALCE or ACP
5.	—	—	—	Maintenance
6.	—	—	—	Supply
7.	—	—	—	Aerial port
8.	—	—	—	Allies
9.	—	—	—	Flight surgeon
10.	—	—	—	Base support
11.	—	—	—	Others (specify)



Identifier

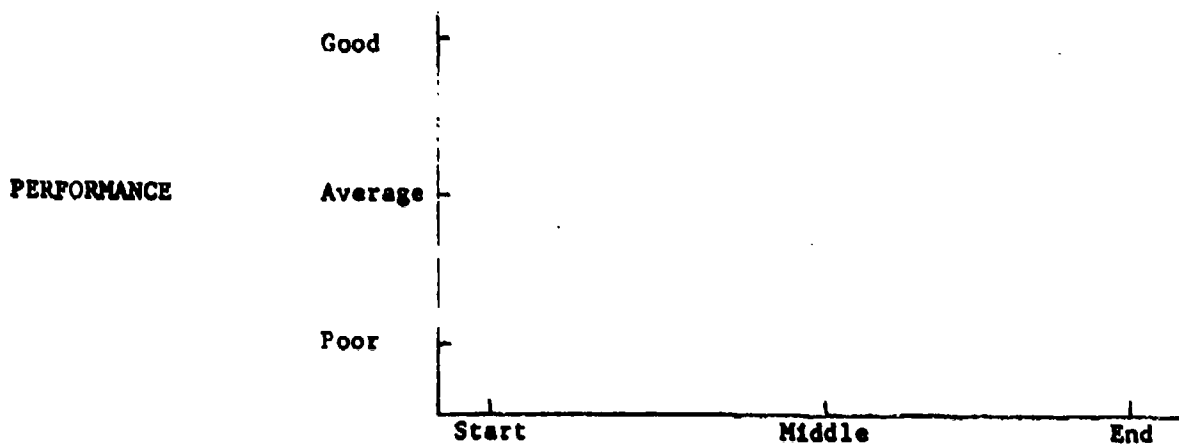
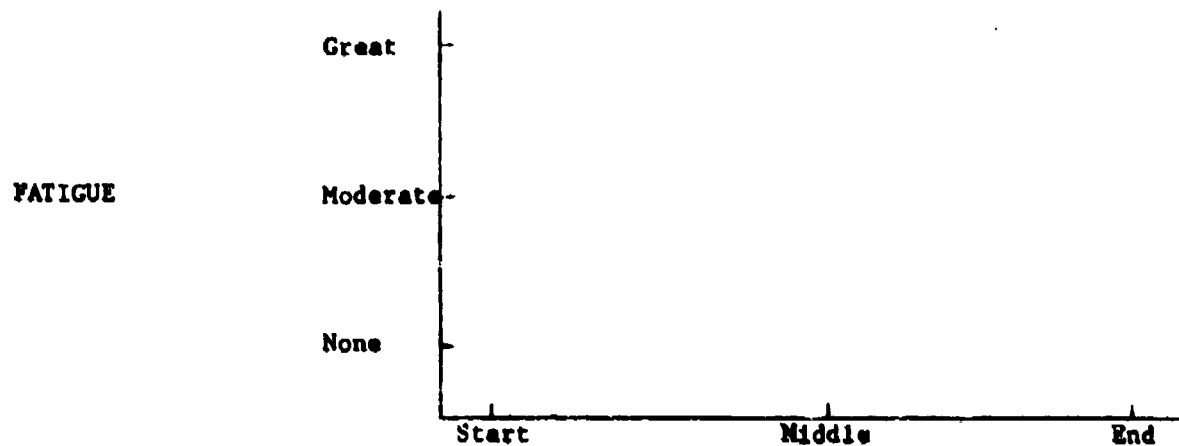
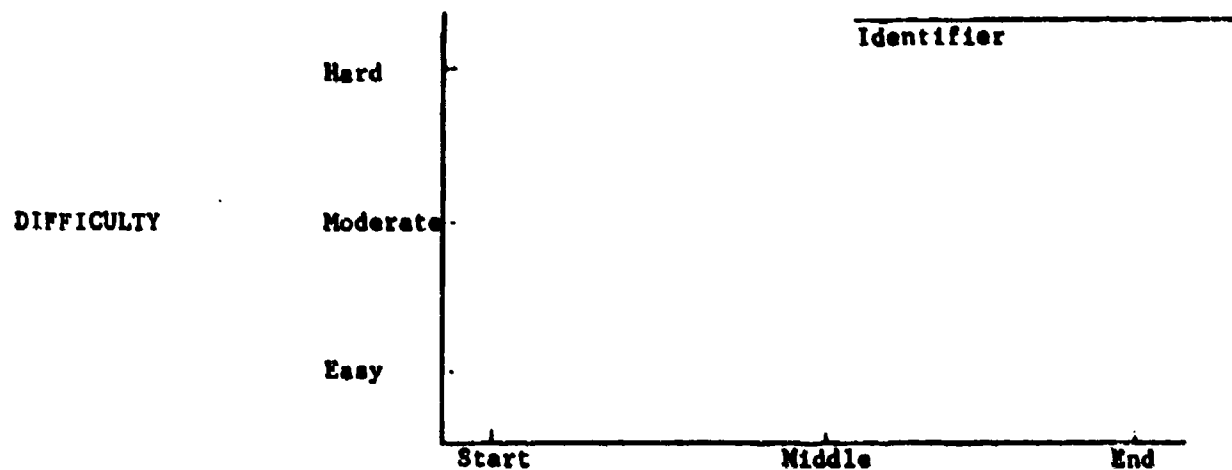
ATTITUDES AND PERSONAL FACTORS DURING NICKEL GRASS

A. Did Nickel Grass have any effect on your: (How?)

- |    | Yes   | No    |                       |
|----|-------|-------|-----------------------|
| 1. | _____ | _____ | Health                |
| 2. | _____ | _____ | Wife                  |
| 3. | _____ | _____ | Children              |
| 4. | _____ | _____ | Career intention      |
| 5. | _____ | _____ | Morale                |
| 6. | _____ | _____ | Frustration threshold |
| 7. | _____ | _____ | Productivity          |

B. Was your attitude affected by: (How?)

- |    | Yes   | No    |  |
|----|-------|-------|--|
| 1. | _____ | _____ | The workload distribution (equitable?) |
| 2. | _____ | _____ | Working conditions                     |
| 3. | _____ | _____ | Reschedulings                          |
| 4. | _____ | _____ | Dead heading                           |
| 5. | _____ | _____ | Delays                                 |
| 6. | _____ | _____ | Accuracy and quantity of information   |



FINAL QUESTION: How long could you have continued the surge? \_\_\_\_\_